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VII. THE USE OF THE SPINES OF CERTAIN ORTHOPTERA.

The Locustid (*Eumegalodon blanchardi*).

Colour and Form.—The whole exposed surface of this well-known and peculiar form is coloured pale brown, speckled, but not in any very marked way, with a darker shade. Its coloration bears a general, and by no means highly specialized, resemblance to a withered leaf.

The most peculiar features of its external form are the enormous stoutness of the head and jaws, and the well-developed thorn-like processes on the thorax.

Habits.—The only specimen secured was captured in a rice-field, then partially flooded, at Belimbing in the Ulu Legeh, on July 22nd. I was crossing the swamp towards a solitary tree of large size that grew on the embankment halfway across. When about ten yards distant from this tree, I noticed what appeared to be a dead leaf falling from one of its lower branches at a height of perhaps eight feet from the ground. Judging from the way it fell that the leaf must have something, perhaps a chrysalis, attached to it, I left the embankment and waded to the place where it had touched the ground, and was surprised to find a fine male specimen of *Eumegalodon* seated motionless on the damp earth. It made no attempt to escape but did its best to defend itself with its really formidable mandibles, a bite from which would have taken a piece right out of the finger.

Remarks.—It is very dangerous to generalize from a single instance of this sort; but the behaviour of the insect was interesting, and may possibly cast some light on the use of the peculiar spines on its back. I am sure, from the rapidity with which it fell and from its appearance while in the air, that the wings were folded as it dropped from the tree; I am also convinced that it dropped and did not leap down. Supposing that its usual habit is to descend thus—and I have no reason to suppose that the behaviour of my specimen was at all peculiar—it is easy to see that its spines, combined with the sturdy build of the anterior part of its body, might assist greatly in breaking its fall, should it strike against anything hard or sharp; for necessarily it would fall head downwards, the head and thorax being heavier than the abdomen. This suggestion does not interfere with the view that these structures may also be of use in defending the insect against its enemies, whatever they may be, should it be attacked from behind; in which case its jaws could not assist it; very possibly it may drop from the tree to escape assailants. Professor Meldola has suggested the same use for the hairs and spines on caterpillars.

VIII. THE PECULIAR PROLONGATION OF THE HEAD IN CERTAIN FULGORIDÆ, AND ITS USE.

Hotinus, Pyrops, &c.

The curious anterior prolongation of the head in many genera of the Fulgoridæ has long puzzled entomologists, and some have

been found bold enough to suggest that in life it is luminous¹; being led to this suggestion, I suppose, by the lantern-like outline of the "nose" in the more highly specialized members of the family, and perhaps by the fact that some of the species at any rate are nocturnal or crepuscular, and rest by day on the trunks of trees in a very open manner. At Biserat in Jalor I was fortunate enough to observe the real use of this peculiar structural modification.

On the morning of May 30th, I noticed a specimen of *Hotinus spinolæ* seated on the trunk of a Durian tree in the village and incautiously attempted to catch it in my hand. The insect remained almost still, merely drawing in its legs towards its body and pressing the claws firmly against the bark, until I had almost touched it. Then, it lowered its head with very great rapidity, flew up into the air without spreading its wings, and alighted on the roof of a house about six feet behind the tree and considerably higher than the position on the trunk whence it had started. When it was at rest its dorsal surface had been directed towards the roof and its head had pointed upwards; but it started off at a tangent from its original station, and landed with its head, speaking roughly, at right angles to an imaginary line drawn through the main axis of the body as it had been on the tree. The insect remained on the roof without moving while I went to get a butterfly-net, in which it was easily captured by a man who swarmed up one of the house-posts.

At the time I did not notice anything peculiar in the way in which this Fulgorid jumped, for there are many large species of the same family (e. g. *Aphæna atomaria*) which, without being provided with long noses, can leap for a considerable distance by means of their legs only; but, as I was examining my specimen after it had died in a cyanide-bottle, I was struck by an indentation or crease that ran across the central region of the nose, at right angles to its main axis. Then I discovered that the chitin was flexible at this point, and at this point only; and that if the tip of the nose and the dorsal surface of the abdomen were pressed together between the finger and thumb and then suddenly released, the insect would not fall straight to the ground, but would be propelled for some distance through the air before doing so; just as would be the case if a piece of whalebone were treated in like manner. Now supposing that the whalebone (representing the nose of the insect) was fixed rigidly to a small rigid object (the head), which in its turn was fastened by a flexible juncture to a larger rigid object (the thorax and abdomen); supposing that the larger object was then laid so that it rested for all its length along a smooth vertical support with the whalebone pointing in front of it, that the free extremity of the whalebone was bent downwards by some force, and that the whole structure was simultaneously shoved away from the support (as the body of

¹ For a coloured picture of a *luminous* Fulgorid, see Donovan's 'Natural History of the Insects of China,' p. 27; also for much evidence as to its luminosity.

the insect might be by its legs), it is obvious that the whole structure would fly off into the air at a tangent; only supposing that the pressure was slightly oblique at any point. I have no doubt that this is substantially what occurs in the case of *Hotinus*; but in the living insect the action is far too rapid for the eye to discriminate its details, and dead specimens cannot be made to leap in this way, because it is impossible to force the legs to perform their part of the action. In two specimens of *Hotinus*, which I observed on tree-trunks at Aring, the wings were spread after the insects had leapt into the air, but not immediately they left their perch. Both of them distinctly bent down their heads before they jumped.

The nose is perfectly hollow, and does not appear to contain any muscle. It differs, of course, from the whalebone in respect of its hollowness, and also in that it is only flexible at one point. In specimens preserved in spirit it is largely filled with liquid, but contains a bubble of air, which naturally rises to the tip when the apparatus is in its resting position, and runs towards its base when the head is lowered.

When I had made the discovery in my first specimen of *Hotinus*, I examined some Fulgorid larvæ, almost certainly those of *Pyrops nobilis*, which had been brought to me by a native at Ban Sai Kau in Nawnchik, and which I had preserved in spirit. The nose was well developed in these, although the abdomen was still small and unexpanded and the wings as yet mere stumps. I found that the joint was present in these specimens also, and still retained a certain amount of springiness, though they had been dead for a month.

Since coming home, I have been enabled, by the kindness of Professor Poulton, to examine dried specimens of twenty-six species of long-nosed Fulgoridæ, belonging to nine genera. In individuals of sixteen of these species I am able to distinguish a crease running across the nose in exactly the same position as it does in my specimen of *Hotinus*. All of the remaining ten species in the Hope Collection, of which species *Pyrops nobilis* is one, have either comparatively short, spiny, or otherwise peculiar noses. I have no doubt that the joint would be found in them also, were fresh specimens examined; even in my larvæ, in which it is still flexible, there is no external sign of its existence except a slight translucency of the integument. The members of the bulbous-nosed American genus *Fulgora* probably use their heads in the same manner as the less highly modified Oriental forms. There is a deep hollow across the noses of the former which seems to correspond to the crease in that of *Hotinus*; and I have satisfied myself at any rate that a certain very limited flexibility exists at this point even in dried specimens. What is wanted is a series of instantaneous photographs from life.

Malay Name.—At Biserat *Hotinus spinolæ* goes by the name of "*Raja Legeh*," but this is probably a corruption of some more direct appellation.

A large proportion of the insects mentioned in this paper have been identified by comparison with specimens preserved at Oxford in the Hope Department of the University Museum, to the officials of which I offer my thanks for the ready help which they have given me. I cannot conclude without expressing my personal gratitude to the Siamese Government for the kindness and generosity with which it treated us throughout: to the officials at Bangkok and Singora who arranged for our reception in lower Siam: to the Malay Rajas through whose territory we passed, without whose aid the Siamese Malay States are practically a closed country to Europeans: and to Luang Phrom, Commissioner of Patani, to Kun Rhat Wan Hussein, and to the other gentlemen who accompanied us as agents of the Siamese Government; at whose hands I received much personal kindness, and whose assistance and advice made it possible to travel in such a country with physical comfort and with some degree of celerity.

3. On the Mammals collected during the "Skeat Expedition" to the Malay Peninsula, 1899-1900. By J. LEWIS BONHOTE, B.A.

[Received October 16, 1900.]

(Plate LVI.)

I have the pleasure of furnishing a report on the collection of Mammals made in the Malay Peninsula by Messrs. R. Evans and F. F. Laidlaw, who accompanied an expedition under Mr. W. W. Skeat. As might be expected, the collection, which includes specimens of 54 species, is of considerable interest, although only one, a rodent, appears to be new to science. A fine specimen of *Macacus rufescens* was procured, which has hitherto only been known by the type, a young example; the presence of *Trichys lipura*, a Bornean species about whose occurrence in this region considerable doubt had been expressed, is of great interest. The collection also contains a fine skull of *Hystrix yunnanensis*; a skin of *Mus cremoriventer*, a scarce species lately described from the Malay Peninsula by Mr. G. Miller, jun., of Washington; and several specimens of *Vesperugo tylopus*, originally described from Borneo.

As Capt. Stanley Flower has lately published a catalogue of the Mammals of Siam and the Malay Peninsula, I have not given the full synonymy but have referred to his paper, only adding the references to one or two subsequent papers to which he did not have access. Great praise is due to Messrs. Evans and Laidlaw for the careful way in which they collected: almost all the specimens having careful dates and measurements, which, apart from greatly adding to their value, has considerably lessened the work of identification. With regard to the position of the places